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USSR ELECTRIC POWER
SELECTED TRANSLATIONS No 9

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FOREWORD

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ELECTRIC POWER CONSUMPTION AT A USSR METALLURGICAL PLANT

Following is the translation of an article by S.I. Moyshevich, Promyslennaya Energetika, No. 2, Moscow, February 1961, pages 4-8. (For purposes of discussion -- Ed.)

It is feasible to examine the conditions surrounding the utilization of electric power from a viewpoint of the functioning system of normalization and other possible systems and to determine their relative usefulness in metallurgical production. The examination of this problem will be conducted on the basis of practical data pertaining to a metallurgical plant with an annual output of rolled iron of 2.5 million tons.

The overall conditions pertaining to the utilization of electric power at the plant under examination is characterized by the following data. During the period from 1951-1959 the consumption of electric power for the needs of production at the plant increased by 81% with a corresponding increase in the output of the basis production of the plant--rolled products, by 86%.

The structure of the utilization of electric power in production appears as follows: energetics--42.5%, agglomerate--12.8%, cast iron--2.2%, steel--4.1%, rolled iron--32.8%, others--5.6%.

The dynamics of the specific expenditure of electric power for the most important types of production are cited in table 1:

Type of production	Share in the overall consumption of electric power, %	Specific expenditure in kilowatt hours		Decrease in specific expenditures, %
		1951	1959	
Agglomerate	12.8	19.3	19.2	0.5
Cast iron	2.2	5.6	5.67	1.2
Steel	4.1	8.7	8.69	--
Rolled iron	32.8	112.5	87.0	22.7
Blast furnace blowing	6.0	4.4	4.07	7.5
Blast furnace gas *	3.8	6.3	3.3	47.7
Water supply	7.4	282	264	6.4
Oxygen	14.2	979	932 **	4.8
	83.3			

*Including the utilization of electric power for the circulation of water.

**Pertains to 1957.

The decrease in specific expenditures permitted an economy of 14.9% in 1959, as compared with the norms for 1951, in electric power with respect to the overall consumption of electric power for the needs of production.

Significant decreases in specific expenditures were accomplished in the production of rolled iron (22.7%) and in the purification of blast furnace gas (47.7%). In rolled iron it was attained principally as a result of an increase in the productivity of the billet mills by 86% and the finished product mills--by 40 to 60%, which in itself yields a calculable decrease in specific expenditures amounting to 15-16%.

The features of an increased specific expenditure per ton of rolled iron is cited in table 2.

Table 2

Year	Production of commodity rolled iron (million tons)	Specific expenditure per ton of rolled iron in kilowatt hours
1951	1.25	254
1952	1.47	236
1953	1.59	228
1954	1.73	224
1955	1.98	204
1956	1.99	232
1957	2.12	244
1958	2.17	255
1959	2.33	252

During the period from 1951 to 1955 the considerable decrease in the specific expenditure of electric power from 254 to 204 kilowatt hours, or a decrease of 19.7% per ton of rolled iron, which was achieved, is explained by the implementation during that period of new techniques for the purification of blast furnace gas in connection with the transfer of the blast furnaces to higher pressure, the implementation of a system of evaporation cooling at the open hearth furnaces, an increase in the output of rolled iron by 59% and the realization of a number of measures for the conservation of electric power.

As a result the consumption of electric power increased only by 27.6% with the concurrent increase in the production of rolled iron during that period of time amounting to 59%. During the period from 1955 to 1959 the increase in specific expenditure increased from 204 to 252 kilowatt hours.

The increase in specific expenditures is basically explained by the introduction of an oxygen station which consumes from 70 to

80 million kilowatt hours a year, and the introduction of two agglomerate strips in 1958 with an annual consumption of electric power of approximately 38 million kilowatt hours with a comparatively small increase in the production of rolled iron.

As a result with an increase in the production of rolled iron during that period, amounting to 17.6%, the consumption of electric power increased by 45%. On the whole there was a decrease of only two kilowatt hours per ton of rolled iron in the specific expenditures between 1951 and 1959.

A comparison between the economy in electric power in the system of an increased expenditure for every ton of rolled iron (0.8%) and in the system of differentiated specific expenditures (14.9%) indicates a considerable disparity between them.

As the measure of the effectiveness in the utilization of electric power, expressed in the system of an expanded normalization, cannot cause any doubt, it must be recognized that the measure of effectiveness expressed in the system of differentiated norms, does not reflect the true state of affairs and because of that cannot serve even as an isolated criteria in the evaluation of results yielded by the utilization of electric power for the plant as a whole.

A characteristic peculiarity of the application of the system of differentiated normalization is the breaking down of the entire production process into a series of individual technological processes and operations and the establishment of an independent norm for each one of them, the purpose of which is the control over the utilization of electric power within the framework of the process or operation.

Table 3 cites comparative data showing the accounted expenditure of electric power as compared with general expenditures, with a consideration of expenditures at the other shops as well, to allow a consideration of the scope of the indicated norms.

Table 3

Product	Accounted expenditures of electric power, kilowatt hours	Overall expenditures of electric power, kilowatt hours	Accounted expenditures with relation to overall %
Agglomerate	19.2	21.5	89.4
Pig iron	5.7	19.8	28.8
Steel	8.7	51.5	16.8
Rolled iron	8.7	113.1	77.0

The difference between the accounted and overall expenditures is basically determined by the existence of power generation systems in a given production process which may then characterize the power consumption capacity of the process. It is evident that the steel production process has the greatest consumption capacity for electric power, where the accounted shop expenditures amount to 16.8% of the overall expenditures of electric power.

Norms for the various types of electric power generation are established in an analogous manner; it should be noted, however, that as a result of more significant concentration of basic and auxiliary processes at the power shops the volume of shop expenditures with respect to the overall expenditures of electric power is considerably higher than that at the metallurgical shops.

The basic deficiencies of the differentiated normalization system are:

1. Its application to power production, whose share in the overall industrial consumption of electric power by the plants is constantly growing and at the present time comprises over 40%; the method of normalization being examined controls only the process of power generation and does not control the process of the utilization of power in production.

This brings about a situation where in many cases the established economy in the production of a certain type of electric power does not reflect the real situation with regards to the entire process as a whole, i.e. generation and utilization. More than that, such a system of normalization in many cases stimulates the attainment of an excessive output of electric power and an excessive consumption of it in order to achieve what appears a considerable economy in electric power.

Here is a graphic example: the norm of electric power consumption for the production of pressure water of 220 kilowatt hours for each 1,000 cubic meters, and the technically based estimate of the expenditure of the water is 10,000 cubic meters per hour. A specific expenditure of 210 kilowatt hours per 1,000 cubic meters with an expenditure of 12,000 cubic meters per hour was attained. With the existing system of normalization the economy of electric power per hour will amount to

$$\frac{(220 - 210) 12,000}{1,000} = 120 \text{ kilowatt hours.}$$

In reality, however, there will be an over-consumption of electric power in the following volume:

$$\frac{210 \cdot 2,000}{1,000} - \frac{220 \cdot 10,000}{1,000} = 320 \text{ kilowatt hours.}$$

A similar situation applies to many other types of power generation. The difference in their influence on the distortion of the resulting consumption of electric power will depend on their consumption capacity for a given type of power and the degree of its deviation from the consumption norm.

2. A portion of the technological factors and measures pertaining to power in the system of differentiated norms either are not reflected at all or are reflected in a very distorted manner in the system of differentiated norms.

Table 4 cites data regarding the effectiveness of the various measures from the viewpoint of differentiated and expanded norms.

Table 4

Factor or measure	Degree of effectiveness	
	In the system of differentiated norms, 1 kilowatt hour per unit of measure	In the system of expanded norms, 1 kilowatt hour per ton of rolled iron
Flux agglomerate (increase in production)	-0.1 kilowatt hours per ton	+ 16.4
Oxygen in open hearth production	-47 kilowatt hours per 1,000 cubic meters	+ 31
Evaporation cooling of open hearth furnaces	Not expressed	- 2.0
Utilization of evaporation cooling steam	Not expressed	- 2.4
Decrease in losses of blast furnace gas	Not expressed	- 0.9
Increase in pressure of the blast furnace gas in the gas network of the plant (a deduction from the work of the gas intensification stations)	Not expressed	- 3.0

Note: Rise (+), decrease (-).

ELECTRIC POWER ENGINEERS ARE WAITING

Following is the translation of an article by N. Krivolay et al. in Ekonomicheskaya Gazeta, Moscow, 12 March 1961, page 2.

The country adopted a course of building predominantly the more profitable thermoelectric power plants. The need in steam boilers is expanding with every year. There is still a lack of them. The boiler-makers are lagging and are holding back the power engineers. That is partially confirmed by facts reported by the Ekonomicheskaya Gazeta of 18 February of this year in an article entitled "The Turbine is Ready, and the Boiler...?"

The article that is published today reveals the reasons for this lag.

In Taganrog there is a plant called "Krasnyy Kotel'shchik." At one time it produced boilers with a productivity of 2.5-3 tons of steam per hour with a pressure of 10 atmospheres. Over the past several years the boiler-makers have produced three units each capable of producing 640 tons of steam per hour. These giants will be used to rotate 200,000 kilowatt turbines.

The personnel of the plant started the construction of a uni-flow boiler capable of producing 950 tons of steam per hour. That is a giant boiler: it is 42 meters high, and 28 meters wide. It will be installed to operate a 300,000 kilowatt turbine. Less metal is used for its construction and less fuel is used after it is placed into operation, which will amount to a saving of millions of rubles per year.

All this is an illustration of the high level of development of the plant. Still, today, we feel compelled to talk about considerable deficiencies in the work of the "Krasnyy Kotel'shchik," which hinder the development of Soviet power engineering.

During the first year of the Seven Year Plan the deliveries of boilers by the Taganrog plant to electric power plants under construction were short six powerful boilers, two boilers of average power and seven low power boilers, as well as a considerable volume of other types of production that is needed by the country.

At the beginning of 1960 the boiler-makers assumed higher obligations. All of the personnel were recruited for the fulfillment of those obligations. Many suppliers were bombarded with appeals: "Comrades, don't let us down." But the second year of the Seven Year Plan brought no improvement either. By comparison with 1959 the gross industrial output increased. However the plan for the output

of commodity production failed once again. The newly constructed electric power plants failed to receive six boilers, equal to Dneprogas in combined power. Economic indices of the plant's work deteriorated. The cost of production increased.

What caused the failure of state plans?

There are many reasons. They are hidden in an inadequate organization of production at the plant and in the impotent half-hearted struggle of its economic and party directors for the utilization of internal reserves. We will talk about that a little later. First of all let us point out the reasons for an outward appearance of order. Especially in view of the fact that they shed light on certain phenomena, that are in contradiction to the party's directions--to utilize the significant economic advantages of the thermo-electric power plants to the utmost.

Over the past ten years four (!) resolutions pertaining to the reconstruction of the "Krasnyy Kotel'shchik" plant were adopted. By the end of the Seven Year Plan the productive areas here must increase more than twofold. At the present time the personnel have to fulfill the bigger assignments within the same work area, with the same equipment and the same sized staff.

It is true that several years ago the construction of a shop for the block assembly of boilers was started. It was planned to place in into operation in 1959. But the building trust No. 1 of the Rostovskiy sovnarkhoz was in no hurry, and the building-installation work was basically completed in December of last year. Even though there already is a shop director, his deputy and several other administrative-management workers, the shop, as a production unit, is not yet in existence. There is no crane equipment, no welding and heating aggregates and finally, no personnel. The machine building administration of the Rostovskiy sovnarkhoz bears the most guilt for all that. There is a lack in boring machines, vertical lathes, radial drilling lathes, tube drawing machines and other equipment. Some 130 additional units of equipment were required last year for the fulfillment of the program, while the sovnarkhoz issued half that number.

For many years now there have been discussions at party meetings and conferences at the plant, the city and the oblast about the need to specialize the "Krasnyy Kotel'shchik" in the manufacture of high power boilers. This question was posed before the State Planning Commission USSR, where it received verbal support, but in practice the plan continues to assign the plant with the production of petty equipment.

There are also inadequacies in the supply system. The State Planning Commission RSFSR must provide the "Krasnyy Kotel'shchik" with 5.5 thousand tons of various pipes, 1.5 thousand tons of stainless steel sheets. But that was not done. Part of the metal and pipes were supplied only by November-December, when the date of the annual plan was essentially resolved.

Also, certain enterprises cooperating with the boiler-makers

are fulfilling their contractual obligations in an unsatisfactory manner. Enterprises of the Rostovskiy sovnarkhoz itself are fulfilling their contractual obligations in an unsatisfactory manner: the Taganrogskiy Combine Plant, the Novocherkasskiy Electric Locomotive Building Plant, and the Azovskiy Bulldozer Plant. The latter made only 7% of the deliveries, and all this right under the elbow of the Rostovskiy sovnarkhoz!

Let us now mention the internal reserves. If the personnel of the enterprise would use them it could function much better.

The most serious deficiency in the operation of the boiler plant is a lack of rhythm and fitful work. During the first ten day period the plan is usually fulfilled by 12%, during the second ten day period--by 15% and during the third ten day period it is 73% completed. The problem is not entirely due to the improper supply of materials. Even during months when the plan is overfulfilled, work is plagued with fitfulness. This "affliction" has become chronic and the entire collective as a unit must apparently engage in remedial measures.

The root of the evil lies in the poor organization of production and of labor, disorder in the inter-shop deliveries and weak discipline.

Let us dwell on the preparations for production. We already talked about the fact that the personnel of the plant have already set about building the first uniflow boiler in the Soviet Union with a capacity of 950 tons of steam per hour. But this work has not yet gained full momentum. It is just beginning. The dies, various devices and the instrument are being built at the present time. In the meantime nothing is being done at the basic shops due to a lack of the necessary equipment and installations that should be manufactured at the plant itself. The directors of the enterprise, of the sections and shops did not think about tomorrow....

The technological section of the plant does not have sufficient influence on the work of the shops and is late in providing blueprints describing the technological processes. There is not yet a truly creative cooperation between the technological workers and the designers. Is it then possible to be surprised at the waste of materials, and the numerous alterations?

The waste of materials at the plant increased during 1960 as compared with the preceding year, and the resultant losses exceeded two million rubles. Some 44 replacement orders were received during the year. A "record" in the production of useless equipment was set by the casting and bulldozer workshops, which accounted for 95% of the overall waste at the factory.

Such reserves as the implementation of new techniques and technology, automation and mechanization of production are also used inadequately. The state plan for the implementation of new technology is only partially fulfilled. 46% of the work in welding production is accomplished manually.

What about the organization of labor! Here is a neglected

portion of work that should be done by the shop directors and foremen. Due to a lack of managerial control and incorrect distribution of manpower at the shops the equipment is frequently idle. Last year it was used only during 48% of the time....

We made observations of a workday. The first shift, surmounting certain difficulties works under tension. At night the roar of the motors, the crackling of the welding equipment quiets down. The management has retired for a rest. The inter-shop deliveries are slowed down. All the achievements of the first shift are voided during those hours. And so it goes from day to day with the exception of short periods of fitful work.

Let us next take up the training of the workers. Less than two hundred persons were trained at the schools of progressive labor over a period of a year. Only a single chart showing progressive experience was published. Comrade Piskovets, deputy chairman of the trade union committee admits that:

Yes, we missed that moment, we will catch up....

Missed it, and how! At one time the plant was famous for its creative approach to the organization of schools of progressive experience, while in December of last year over 12% of the workers failed to fulfill their norms.

The distribution of engineers should also be mentioned. There is a large number of cadre boiler-makers at the plant who are thoroughly familiar with their jobs. They are the ones who must direct the production. But so far there are very few engineers among the shop directors, and only two of them are boiler-makers, and they do not head active shops--the shop for the block assembly of boilers and the chemical water purification shop.

The mechanical shop No. 1 and the armature shop have no engineers at all. Among the 166 workers engaged in technical control there are only eight engineers. During the last three year period some 79 specialists with a higher education came to the plant through the sovnarkhoz. During the same period of time 33 boiler-makers completed institutes without leaving production. The shops are waiting for those people....

The personnel of the "Krasnyy Kotel'shchik" have all the possibilities to close the gap and to restore their former glory as progressive workers. These possibilities must be used.

FOR SAVINGS IN ELECTRIC POWER

Following is the translation of an article by I.G. Zasyupkin and M.A. Sotnikov in Promyshlennaya Energetika, Moscow, 12 March 1961, pages 9-11.

The coal, chemical, metallurgical industries, machine building and non-ferrous metallurgy are growing at a rapid tempo in the Karagandinskiy economic administrative rayon; the amount of electric power available to them is expanding from year to year, which is conducive to a growth in the productivity of labor.

During 1960 the electric power plant of the Karagandinskaya power netowrk produced 33% more electricity during 1960 than during 1959, while in 1965 the production of electric power will be 4.3 times greater than that produced during 1958 according to the Seven Year Plan for the development of the national economy. Despite such tempos of development of the power system, however, the demand for electric power at the Karagandinskiy, Balkhashskiy, Pavlodarskiy and Akmolinskiy power rayons surpasses the growth of the capacities of the electric power plants.

For a more comprehensive satisfaction of the expanding requirements of the national economy in electric power it is necessary to organize a wise and rational system for utilizing every kilowatt hour.

An important measure was the creation of 319 permanent commissions for cooperation with a rational system of utilizing electric power in January of 1960 at enterprises of the economic rayon. In February of 1960 the Kargandinskiy oblast committee of the komsomol established 109 headquarter organizations, unifying 624 komsomol posts in order to assist the permanent commissions. In February of 1960, the electric power utility service published a pamphlet entitled "On the Rational Utilization of Electric Power and Heat," as well as nine poster-appeals.

The norms of electric power consumption at most of the enterprises were reviewed and decreased by an average of 2% as compared with the norms for 1959.

The industrial enterprises, in cooperation with the branch administrations and combines developed organizational-technical measures designed to save electricity with an overall economic effect of 57 million kilowatt hours.

All the measures that were developed are directed basically at the perfection of technological processes, an improvement in the load

borne by the equipment, the introduction of automation into industrial processes, and the installation of highly productive equipment instead of the outdated equipment at the enterprises.

As a result of the work that was accomplished and of the fulfillment of the established plans for organizational-technical measures the majority of the enterprises of the economic rayon attained a considerable decrease in the consumption of electric power both in the normalized production and for the enterprise as a whole.

Over a period of nine months during 1960 the sovnrkhoz enterprises, as well as those of other ministries and administrations implemented 326 measures aimed at saving electric power; as a result some 49,583 thousand kilowatt hours were saved.

The enterprises which achieved considerable savings in electric power as compared with specific norms include: the Balkhashskiy Gornometallurgicheskiy Kombinat, the Dzhezkazganskiy Metallurgicheskiy Zavod, the "Karagandaugleobogashcheniye," "Kirovugol'," "Stalinugol'," and "Promstroyaterialov" trusts.

There are still enterprises, however, which during the current year allowed an excessive consumption of electric power. They include: the Karagandinskiy Cement Plant, the "Leninugol'" trust, the "Pavlodarstroy" Administration and the Karagandinskiy brewery.

Let us cite some of the more effective measures for conserving electric power.

Some 59 measures were implemented at the non-ferrous metallurgical enterprises during 1960; the resultant saving amounted to 18,200 thousand kilowatt hours; a total of 29,063 thousand kilowatt hours of electric power was saved over a period of nine months. The most effective measures were the reconstruction of flotation machines "Mekhanobr-5" at the purifying flotation section (an annual saving of 1,300 thousand kilowatt hours); the reconstruction of mills at the beneficiation plants (an annual saving of 2,800 thousand kilowatt hours); the implementation of deep lead-ins at the mines and the positioning of transformer points at the center of the loading area (2,600 kilowatt hours were saved); the utilization of oxygen blowing in the electric furnaces and converters (1,060 thousand kilowatt hours were saved).

12 measures were implemented at the Kazakh Metallurgical plant with an effectiveness of 1,000 thousand kilowatt hours with an overall saving of electric power amounting to 2,121 thousand kilowatt hours during 1960.

11 measures for the conservation of electric power were implemented at the Karagandinskiy synthetic rubber plant during 1960. In the course of the second half of 1960 two significant suggestions were implemented that permitted a rise in the production of calcium carbide on the existing production areas.

Two furnace transformers were reconstructed with a tension of 6.3 kilowatts and a capacity of 7.5 thousand kilowatts each, which previously were connected to the intermediate transformer which had a

capacity of 20 thousand kilowatts and a tension of 31.5/6.3 kilowatts. After reconstruction the intermediary transformer was disconnected; the capacity of each furnace transformer was raised to 10 thousand kilowatts and the tension on the high side was raised to 31.5 kilowatts. A deep lead-in directly to the carbide furnaces was thus made, which allowed two of the furnaces to raise their output of calcium carbide by 14%. The annual saving of electric power due to the liquidation of the intermediary transformation amounted to 1,700 thousand kilowatt hours.

A system for feeding the furnace transformer with a capacity of 60 thousand kilowatts, which, according to the draft was fed through the 60 thousand kilowatt intermediary transformer with a tension of 110/38.5 kilowatts. In August of 1960 a system of deep lead-in was introduced for a 60 thousand kilowatt furnace transformer with a primary tension of 110 kilowatts. The transformer is fed through a cable lead-in for 110 kilowatts. The annual saving of electric power due to the liquidation of intermediary transformation amounted to 4,840 thousand kilowatt hours. Enterprises of the building materials industry developed measures which resulted in a saving of 2,100 kilowatt hours; in the course of three quarters the enterprises saved 1,838 thousand kilowatt hours of electric power.

156 measures were developed at the enterprises of the coal industry with very negligible results--a saving of only 2,601 thousand kilowatt hours; however, the "Karagandaugol'" combine saved 6,944 thousand kilowatt hours during the three quarters of 1960.

The electric power supply organizations constantly direct the attention of the enterprises to the need to improve the $\cos \phi$. As a result of the extensive organizational-technical work that was accomplished a number of enterprises attained good results during 1960. By replacing the asynchronous motors with synchronous motors the Karagandinskiy cement plant raised the $\cos \phi$ from 0.88 to 0.951; the Kazakhskiy metallurgical plant installed synchronous motors in its rolling mills, as a result the \cos rose from 0.844 to 0.957. At the Altasuyskiy Ore Administration and the Kazmetallurgstroy the $\cos \phi$ was raised from 0.71 to 0.89 and from 0.732 to 0.846 respectively. During the current year a large number of cosinal static condensers were installed at these enterprises.

Technological methods for an effective charging of carbide furnaces were developed by the engineering technical workers at the Karagandinskiy synthetic rubber plant along with the workers from the electric power supply organizations; as a result the capacity coefficient increased from 0.825 to 0.844.

At the Balkhashskiy and Dzhzhkazganskiy power rayons the capacity coefficient is maintained with the limits of 0.92-0.94.

A serious obstacle to an increase in the capacity coefficient for the consumers is an unsatisfactory supply of cosinal condensers. The provision of the new enterprises and building enterprises with compensating installations is particularly inadequate. The capacity coefficient of the "Karagandaugol'" combine's enterprises dropped

from 0.927 to 0.908 during 1960. It should be noted during 1956 the capacity coefficient was 0.965. Without receiving the necessary number of static condensers, the enterprises are unable to replace the ones that break down.

After a discussion of the letter from the Central Committee CPSY "On a Rational Utilization of Electric Power in the National Economy" the socialist competition among the enterprises for the conservation of electric power was organized once again in the Kazakh SSR, and was of considerable significance in the fulfillment of the organizational-technical measures for the rational utilization of electric power and heat that were adopted by the enterprises.

Competitions were held at the Balkhashkiy and Dzhezkazganskiy metallurgical mining combines during 1960 for the best suggestion pertaining to the conservation of electric power. The Karagandinskiy sovmarkhoz along with the Karagandinskiy oblast soviet of trade unions announced a competition of electric power; the competition covered the Karagandinskaya, Akmolinskaya and Pavlodarskaya oblasts.

ELECTRIFICATION OF AGRICULTURE IN THE USSR

Following is the translation of an unsigned article in Gidrotekhnicheskoye Stroitel'stvo, No. 4, Moscow, April 1961, pages 1-2. /

The Central Committee CPSU and the Council of Ministers USSR examined the problem pertaining to the electrification of agriculture of the USSR for the period from 1961 to 1965. The resolution adopted on that subject points out that the tempos of the electrification of agriculture have increased significantly during the recent years, the number of rural consumers receiving electric power from some of the more reliable sources of electric power--state power systems, industrial and rural electric power plants of increased capacities. In attributing important government significance to the matter of the electrification of agriculture the Central Committee CPSU and the Council of Ministers USSR delegated with ministries of the union republics with the task of determining the most economical sources of electric power supply for each kolkhoz and sovkhoz, the development and implementation of plans for the utilization of the existing and the construction of new electric power networks, transformer substations and rural electric power plants for the period from 1961-1965, and to conduct the electrification of agriculture in accordance with the following:

In rayons where the state power systems and individual industrial electric power plants are in operation--by connection to the existing and newly constructed electric power networks as well as to the sub-stations supplying power to the electric railroads;

Rayons which are isolated from the state power system networks, from industrial electric power plants and electric railroad power substations--should be electrified, as a rule, through the construction of inter-rayon and rural rayon diesel electric power plants and hydroelectric power plants of a higher capacity, and in individual cases through the construction of rural rayon and inter-rayon steam turbine and gas turbine electric power plants;

Sparsely populated rayons, where the construction of rural inter-rayon and rayon electrical power plants is not feasible--electrification should be accomplished by building economical inter-kolkhoz, kolkhoz and sovkhoz electric power plants.

The need was recognized to significantly expand the volume of state capital investments during the period from 1961 to 1965 in the electrification of agriculture.

In order to provide the kolkhozes, sovkhozes and other rural consumers with electric power from state power systems, industrial, communal and rural electric power plants, a plan was adopted for the construction of electric power transmission lines for the electrification of agriculture during 1961-1965.

The Ministry of Railways and the Ministry of Transport Construction in drafting and building electric power substations for the electrified sections of the railroads must also allow for the provision of electric power to the kolkhozes, sovkhozes, Maintenance and Technical Stations, rayon centers and other consumers at the given point as well as in the adjacent rayon.

The Central Committee CPSU and the Council of Ministers USSR have delegated the Central Committees of the communist parties and the Councils of Ministers of the union republics with the task of developing measures for the implementation of electric power into agricultural production so as to convert the water supply system, milking machines, sheep shearing units, machines for the preparation of fodder, for the cleaning and drying of grain, for the preliminary processing of agricultural products, equipment of kolkhoz and sovkhoz workshops as well as other stationary machinery and equipment to electrical operation not later than 1965.

The Ministry of Agriculture USSR was delegated with the task of ascertaining that the plans for the period from 1961-1965 for the institutes under their direct jurisdiction include provisions for an expansion of the scientific-research work pertaining to a further technical progress in the field of the utilization of electric power in agricultural production.

The Council of Ministers RSFSR, Council of Ministers Ukrainian SSR, Council of Ministers Armenian SSR and the Ministry for the Construction of Electric Power Plants were delegated with the task of assuring the development, manufacture of experimental models and the organization of serial production of new types of electric equipment, electric apparatus, materials and cable products, necessary for the electrification of agriculture.

The State Planning Commission USSR and the Council of Ministers of the union republics were delegated with the task of including into the plans for the development of the national economy, provisions for the supply of materials, equipment and means of transportation, necessary for the accomplishment of projects for the electrification of agriculture.

The All-Union Society "Soyuzsel'khoztekhnika" and the Ministry for the Construction of Electric Power Plants must develop new typical designs for the construction of the most economical rural electric power plants and sub-stations.

The Council of Ministers of the union republics have been delegated with the task of developing and carrying out measures for the improvement of the drafts, the construction and the exploitation of rural electric power plants and electric installations, to supply cadres for the republican and local organizations, that are engaged in

the construction and exploitation of rural electric power plants and electric installations, to provide those organizations with building machinery and means of transportation; they are also delegated with the task of providing the training for cadres engaged in the mass professions pertaining to the electrification of agriculture in the secondary rural general education schools with production training, in the schools of mechanization of agriculture and in the rural professional-technical schools.

The State Economic Council USSR, the State Planning Commission USSR, the All-Union Society "Soyuzsel'khoztekhnika" and the Ministry for the Construction of Electric Power Plants have been delegated the task of studying the problem pertaining to an improvement in the organization of the management of planning and construction of agricultural electrification projects and to submit suggestions to the Council of Ministers USSR, in cooperation with the Councils of Ministers of the union republics.

The party central committees, the Councils of Ministers of the union republics, the All-Union Society "Soyuzsel'khoztekhnika" and the Ministry for the Construction of Electric Power Plants have been delegated with the task of assuring the organization of work in the construction of rural electric power plants, substations and power transmission lines, in the wide-scale implementation of electric power into agricultural production and in the establishment of a systematic control over the fulfillment of the adopted resolution.

POWER TRANSMISSION LINES — IMPORTANT LINKS IN ELECTRIFICATION

Following is the translation of an unsigned article in Ekonomicheskaya Gazeta, Moscow, 28 March 1961.

Our country is becoming electrified at an accelerating tempo. Last year the production of electric power increased by almost 30 billion kilowatt hours, which is approximately equal to the output of one of the most highly electrified country in the world--Norway.

The first of the unique aggregates at the Bratskaya Hydroelectric Power Plant will be placed into operation during the third year of the Seven Year Plan. Power blocks with a capacity of from 150 to 200 thousand kilowatts each are being introduced at the Yuzhno-Ural'skaya, Nazarovskaya and other thermal electric power plants. Some of them are already in operation.

In order to transmit electric power from the plants to plants, factories, railways, cities, sovkhozes and kolkhozes we have the most powerful power transmission lines in the world with a tension of up to 500 kilovolts. Work for the creation of unified power systems for the European portion of the USSR, Western Siberia, Central Asia and the Trans-Caucasus is nearing completion.

During the period from 1959 to 1965 it is stipulated to increase the length of the power networks with a tension of from 35 to 500 kilovolts more than threefold with a slightly more than twofold increase in the power generation capacities. This will permit a centralized supply of electric power for the cities, industrial and rural rayons, with a decrease in the construction of small, uneconomical power installations.

During the first two years of the Seven Year Plan the builders of high voltage power transmission lines and step-down substations achieved definite successes. Tens of thousands of kilometers of new high voltage lines were placed into operation (including the first chain of the line from the Stalingradskaya Hydroelectric Power Plant to Moscow), and many railroad sections were electrified.

The methods and means of constructing the lines are being perfected. The builders, for instance, began to utilize progressive reinforced concrete supports on a much wider scale. This year the "Sovzapelektroset'stroy" will build specifically this type of supports on over 70% of the lines. The Ministry for the Construction of Electric Power Plants USSR accomplished a considerable volume of work in the unification of supporting structures.

But not all is going smoothly. There are considerable deficiencies in the construction of high voltage power transmission lines.

Deadlines are frequently violated. There are therefore cases where the new economical power units at the powerful electric power plants stand idle--the power that is generated has no place to go.

Last year, for example, the 300 kilovolt power transmission line Kremenchugges-Pervomayskaya was not ready by the time the Kremenchugskaya Hydroelectric Power Plant went into operation. Consequently the plant was able to provide the consumers only a third of the power it generated along the temporary transmission line.

The example of the Novosibirskaya Hydroelectric Power Plant is even more striking. It was placed into operation several years ago. But a 220 kilovolt transmission line began operating only in November of last year between the Novosibirskaya Hydroelectric Power Plant and Belovo, which supplies the Kemerovskiy economic rayon with electric current. Even after the advent of the high water period, some of the turbines remained idle. The loss of electric power, according to the most conservative estimates, amounted to over 500 million kilowatt hours in this case.

The current year unfortunately started with a failure to adhere to the established levels. Things are particularly bad at one of the large Seven Year Plan construction projects--the second chain of the 500 kilovolt power transmission line from the Stalingradskaya Hydroelectric Power Plant to Moscow. It must go into operation before the high water period on the Volga.

The most difficult segment of the power line remains to be constructed at the present time: in direct proximity to the capital, in an area with a dense network of railway lines, high voltage power transmission lines and other lines of communication. There is a lot of work to be done, and little time to do it in.

It is a matter of honor for the "Glavtsentreletroset'stroy" workers to successfully complete the important state assignment in order to prevent the country from losing millions of kilowatt hours of electric power so necessary to our economy.

Let us consider the power transmission line from the Stalingradskaya Hydroelectric Power Plant to Donbass. This direct current line with a tension of 800 kilovolts is very important for the solution of the problem pertaining to the transmission of electric power over great distances; its construction, however, is progressing very slowly.

A certain lack of concise management and organizational incongruities are observed both in the construction of that and other lines. The line builders do not have a sufficient number of the proper type of motor vehicles, hoisting cranes of the required power (10 tons) and other equipment. The material balance department and general distribution plans with the State Planning Committee USSR do not always satisfy the justifiable demands made by the builders of electric lines.

The building rate of the lines is slowed down due to an untimely arrival of the fourth and fifth clearance diagrams. Last year

the transformer plants failed to fulfill their obligations to the power line builders.

There is also a lack of reinforced concrete supports in Siberia. At the "Glavvostokelektroset'stroy" (Main Administration for the Construction of Electric Power Networks in the East), for example, there is not a single active enterprise for their production. It is not surprising that in Siberia and Central Asia less than a third of the supports are not reinforced concrete.

The uneven distribution of labor over the quarters also hampers the fulfillment of the annual plans. Over one-half of the final work is done during the last months of the year! Drafting, planning and the production of the equipment is organized in such a manner that it is practically impossible to complete the construction of the line at the beginning of the year! as a rule, during the first and the second quarters only those lines go into operation which were to have gone into operation at the end of the last year according to the plan.

This practice is incorrect. It must be overcome by the combined efforts of the State Planning Committee USSR and the Ministry for the Construction of Electric Power Plants.

The most important factors depend on the builders themselves, on their ability to manage the affairs in a satisfactory manner. The entire Soviet people, the entire country are preparing to welcome the 22nd Congress CPSU with new labor successes. Competition in honor of the congress developed on a wide scale among the builders of high voltage power transmission lines and power networks as well. The favorable results of this competition, which will undoubtedly help to accelerate the tempos of the electrification of the country, are already being felt.

IMPORTANT SOURCE OF KOLKHOZ AND SOVKHOZ ELECTRIFICATION

Following is the translation of an article by N. Podgants in Sovetskaya Rossiya, Moscow, 24 March 1961. /

The electrification of kolkhozes and railroad transportation. It seems that they have nothing in common, but they do.... We are talking with Igor' Ivanovich Ivanov, the chief engineer of the Administration for the Electrification and of Power Engineering of the Ministry of Railroads. He constantly glances at a large map covered with fine lines. These lines represent electrified sections that are either already in operation or are under construction. The scope of the work is really tremendous. Approximately 20 thousand kilometers of railroads are to be converted to electric traction during the Seven Year Plan; this year it is planned to convert over two thousand kilometers. Electric trains will run from Khrakov to Debel'tsevo, from Perm' to Balesino. Sections supplied with alternating current will go into operation: Vladimir-Gorkiy (249 kilometers) and Ilovayskoye-Rostov-Kavkazskaya (453 kilometers).

Imagine how many kolkhozes and sovkhozes will be able to obtain cheap electric power within the immediate future! This will of course be conducive to a further expansion in agricultural production, says Igor' Ivanovich with elation.

Could you tell us how much electric power was provided by the railroads during the second year of the Seven Year Plan, we ask the chief engineer.

Approximately three hundred million kilowatt hours. The power engineers of the Stalinskaya railroad provided an outstanding amount of assistance to the kolkhozes. Last year that trunk line supplied the rural consumers some 60 million kilowatt hours out of its "electric balance," the Omskaya trunk line provided almost as much power, and the Kuybyshevskaya trunk line furnished over 20 million kilowatt hours. It is interesting to note that over 60 kolkhozes and sovkhozes will receive their electric power from the railroad power networks of the Omsk trunk line.

In connection with the electrification of the Ryasan'-Sasovo sovkhozes starting receiving electric power from the Listavnskaya railroad substation. The Nazarovskaya and Perevleskaya railroad substations furnished power to the agricultural farms and the homes belonging to the kolkhoz members. Quite recently electric power appeared at the kolkhoz settlement and at the sovkhozes close to the Rybnov plant. After the electrification of the Orel-Kursk sector two

new railroad substations started supplying electric power to the kolkhozes imeni Lenina, imeni Kalinina and the "Put'k Kommunizmu" kolkhozes.

Power transmission lines stretch alongside the trunk railroad lines. What is the purpose for them?

At the present time there are over five thousand kilometers of such lines. This year an additional five thousand kilometers will be constructed. They lead from the railroad substations and other sources of power and are primarily designated for the supply of electric power to the buildings, signal huts and to the homes of the railroad workers. You probably have noticed, however, that there are branches leading off from these main lines. They will lead you to kolkhozes, to farms and to rural homes. They brightly illuminate the kolkhozes and sovkhoses....

This is the way the railroad workers assist in the electrification of the village.

THE ELECTRIFICATION OF AGRICULTURE -- IMPORTANT TASK FOR
POWER ENGINEERS AND MACHINE BUILDERS

Following is the translation of an article by M. Ya.
Aleksandrov in Energetik, No. 4, Moscow, April 1961,
pages 1-3. _/

According to data furnished by the Central Statistical Administration over 99% of the Technical and Repair stations in the country were electrified by the beginning of 1960 as well as 96% of the sovkhozes, 61% of the kolkhozes and only 36% of the personal households of the kolkhoz members.

The overall consumption of electric power in agriculture amounted to 8.4 billion kilowatt hours in 1959, while during 1965 it is planned to provide the agriculture with 23-25 billion kilowatt hours; 60% for technical needs and 40% for public consumption.

During the period from 1961-1965, 69 thousand kilometers of power transmission lines must be constructed with tensions of from 35 to 110 kilovolts and 1,250 kilometers of transmission lines with a tension of from 10 to 0.4 kilovolts.

The number of electric motors in agriculture must increase from 800 thousand in 1959 to three million in 1965.

Electrical engineering plants must supply agriculture with power transformers with a total capacity of 15 million kilovolt-amperes, and 1,350 thousand tons of various types of cable.

In 1961 it is planned to: organize the production of automatic diesel-electric generators with a capacity of up to 1,000 kilowatts; to supply agriculture with a large volume of complex substations and insulators; to evolve new types of electric equipment, machinery, and apparatus which may be used with the most feasibility in the electrification of agricultural rayons. It is necessary to develop low power switches, electric drives, transformers, lightning shields, simple single phase motors that operate according to a system "one wire-ground" and other items.

Only one half of the sovkhozes and kolkhozes that have been electrified receive their electric power from reliable sources of power supply--power systems and large industrial electric power plants at government established rates. The other electrified kolkhozes and sovkhozes are supplied with electric power by low power small electric power plants and the cost of electric power supplied by them is several times higher than the government rates.

The inadequate capacity of the rural electric power plants and the high cost of the electric power generated by them limits their

usefulness.

At the present time there are extensive possibilities in our country for the electrification of agriculture by tapping the power systems, communal electric power plants and railroad power plants located on the electrified portions of the railroads.

The task is established of electrifying 90% of the agricultural projects through the power systems.

END

NEW DESIGNS OF THERMAL ELECTRIC POWER PLANTS

Following is the translation of an article by F. Sapozhnikov in Stroitel'naya Gazeta, Moscow, 23 April 1961.

The construction of new and the expansion of the existing thermal electric power plants is the principal direction taken by power engineering in our country during the current seven year period. It is impossible to attain this goal without technical progress in design.

How do the designers handle their problems?

I. Stomakhin, chairman of the model designing section of the State Building Office USSR in his article entitled "The Militant Program of the Designers" published in Stroitel'naya Gazeta on 28 December 1960 pointed out unified designs of typical GRES (Gosudarstvennaya Rayonnaya Elektricheskaya Stantsiya--State Rayon Electric Power Plant) as an example of the successful application of new principles of industrial construction. These principles are best expressed in the GRES with a capacity of 2,400 thousand kilowatts, the working drafts for which were completed in 1960.

First of all the technological basis of these plants is progressive. Its capacity, which is almost four times greater than the largest operating thermal electric plant, is achieved not by an increase in the number of the units, but through higher productivity. Turbo-generators with a capacity of 300 thousand kilowatts will be installed at that power plant, instead of the 100 thousand kilowatt turbines that are most frequently used at the present time. This will allow an almost twofold decrease in capital investments.

The application of higher parameters (pressure of 240 atmospheres, temperature of 585°), as well as an intermediate heating of steam will permit a significant decrease in the specific expenditure of fuel.

Considerable changes were introduced into the arrangement of the electric power plants. Several years ago the designs were based on up to forty separate buildings. At the present time it is necessary to construct only ten buildings. Many of the auxiliary shops are grouped into a single building. As a result the overall plan for the thermal electric power plant becomes more compact.

The equipment in the basic building is arranged in a more convenient manner, the building is designed in a stricter and a more logical manner, the stairwells are bigger and the distance between the columns was increased to 12 meters.

There are two designs for the main building, depending on the type of fuel that will be used--solid fuel or gas-oil type of fuel. The design for a plant using coal fuel consists of two sets: one with an individual coal pulverizer and the other with a central pulverizer plant. In all cases a semi-enclosed arrangement of the boiler units is made under a light shelter; the load of the enclosed surfaces and pressure from the wind is placed on the structural frame of the boiler. In contrast to the former designs, a combined deaerator-bin with a span of twelve meters and a height of thirty meters is constructed.

All of these innovations permitted a sharp decrease in the size of the building along with an economy in building materials. The Simferopol'skaya GRES, for example, designed in 1957, produced one kilowatt of power for 450 kilograms of fuel, and in the model design of the GRES-1,200 it was lowered to 160 kilograms, whereas the design for GRES-2,400 lowered it still farther to 125 kilograms.

For the first time in model designing it is planned to construct pre-assembled trusses with a span of forty-five meters and crane support beams for cranes with a 100-ton hoisting capacity. Pre-assembled foundations have also been designed for the equipment, including foundations for the unique turbo-generators with a capacity of 300 thousand kilowatts, which create a great vibration stress.

It should be especially stressed that after the construction of the Simferopol'skaya GRES out of industrial elements, the utilization of pre-assembled reinforced concrete components, manufactured at the plant, became a rule. At the present time almost all of the thermal electric power plants are being designed to include supporting components manufactured by the constantly operating rayon enterprises. The number of such electric power plants will increase from four in 1958 to 86 by the end of 1965.

The designing of main buildings out of monolithic structural frames has been completely abandoned. It is possible to encounter metal structures only in isolated buildings. The level of pre-assembled components in the main buildings designed in 1958 was 40-45% whereas the new designs raise that level to 80-85%.

The builders are implementing these progressive decisions into life. Twelve thermal electric power plants have already been constructed, consisting entirely of pre-assembled reinforced concrete components. Forty more such enterprises will be built during the next several years.

In addition to an improvement in the structural features, the new designs include a more efficient arrangement of the equipment, the loading diagram is improved, the underground operating area as well as that of the main building and of the entire plant was simplified.

All these improvements permitted a saving of 175 thousand tons of steel, 1,750 thousand cubic meters of reinforced concrete and 17 million man days at 52 electric power plants.

It must be said that improvements were also introduced into the designs for thermal electric power plants under construction which permitted them to lower their overall cost by more than 200 million rubles in terms of the new prices.

At the present time, when most of the building components are made out of pre-assembled reinforced concrete, it is particularly important to unify the structural planning features, to decrease the number of different size components and products. The number of typical designs of thermal electric power plants are therefore decreased. In 1958 64 plants were constructed according to 39 designs (including 26 plants which were built according to custom designs), whereas by the beginning of next year it is planned to decrease the number of designs by two times, and in another year it is planned to use from four to six designs.

Our design institutes are faced with the task of creating a limited selection of pre-fabricated components (with a small selection of sizes), out of which it will be possible to construct buildings for electric power plants of various capacities. The foundation for this was laid in the form of a catalogue of unified components, prepared by the Teploelektroproyekt institute (All-Union State Institute for the Design and Planning of Thermal Electric Power Plants). Over 70% of the items listed in it are suitable for plants of any capacity.

We discussed the successes attained in the design of thermal electric power plants. At the same time it is impossible to neglect something that disturbs us--the unresolved tasks, and there are quite a few of them. The builders have so far shortened the construction period for only a few projects; on the whole, however, the construction of the plants is usually prolonged. This occurs principally because the building is behind schedule. The designers, technologists and builders must therefore devote special attention to the perfection of prefabricated components and to the technology of their manufacture and assembly.

Every new feature must naturally receive preliminary testing. Unfortunately the Teploelektroproyekt and the Promenergoprojekt (All-Union State Institute for the Design and Planning of Industrial Power Resources) are frequently unable to conduct experimental testing due to a lack of testing facilities. Reinforced concrete components designed to go under the structural frame of the building and to withstand stress of up to 900 tons at the Kiev "Stroydetal'" plant, as well as the reinforced concrete beams with a span of 24, 30 and 36 meters at the Dubrovskiy combine and the Kurakhovskiy plant were tested on temporary stands. This prolonged their testing and assimilation.

It is necessary to create experimental shops and laboratories as a part of the prefabricated concrete plants under our Ministry for the testing of reinforced concrete components, which would be under the jurisdiction of the design institutes. Such laboratories will be helpful in speeding up the implementation of pre-stressed-reinforced, or the so-called compressed joints of spanners and beams with columns,

with a stress capacity of from 1,000 to 1,700 tons, prefabricated foundations for turbo-generators as well as in assimilating the construction of pumps for technical water supply.

It is planned to construct such experimental installations at four plants of the Ministry for the Building of Electric Power Plants. It is very important for them to be constructed and placed into operation this year.

Despite that it is necessary to organize an experimental center (taking into consideration the peculiarities of prefabricated components used in power engineering projects). At first it would be feasible to organize such a center as a scientific research sector with the Teploelektroproyekt institute. The experience gained by such a sector at Gidroproyekt indicated what a great significance is borne by a direct contact between the designers and experimentation.

At the present time, when the capacity of the thermal electric power plants is expanding at a great rate and the prefabricated reinforced concrete components are used on a wide scale, the time is ripe for introducing changes into the technology of construction and design work. The builders would like to receive the blueprints well in advance of the date when the production of the components is to start. Such a demand is not always satisfied, especially because the designers are unable to obtain the initial data on time from the boiler plants.

The builders have been using a combined method of installing the equipment simultaneously with the construction of the building. This method justified itself in cases where the plant under construction consisted of one or two blocks. For larger projects such a method, in our opinion, is unsuitable. In order to accelerate the construction of thermal electric power plants it would be feasible to separate building work from the installation of equipment. This will permit expanding the front, eliminate equipment idleness and achieving a higher specialization of the processes.

The further perfection of the model drafts, the plant manufacture of all the elements, the development of an experimental-research basis and the specialization of building-installation work will permit a more rapid and cheaper construction of the thermal electric power plants. This is most important in order to assure that the development of power engineering would progress in the proper direction.

END

THE BASIS FOR A RAPID DEVELOPMENT OF POWER ENGINEERING

Following is the translation of an article by I. Ganichev, in Stroitel'naya Gazeta, Moscow, 23 April 1961.

Third year of the Seven Year Plan--it is time for a sharp upsurge in the development of Soviet power engineering. This year the capacity of the electric power plants must increase by 7.8 million kilowatts and plants with a combined capacity of 15.5 million kilowatts have been started. In connection with that the Ministry for the Construction of Electric Power Plants is faced with the task of completing 1,350 million rubles worth of building-installation work. During the subsequent years the volume of work will expand and by the end of the Seven Year Plan they will have increased almost twofold.

In accordance with the decisions of the 21st Congress CPSU regarding the most rapid expansion of power capacities during the current seven year period, emphasis is placed on the construction of thermal electric power plants. Our design institutes developed model designs for thermal electric power plants with capacities of 2,400 thousand, 1,200 thousand, 600 thousand and 400 thousand kilowatts, which will provide an opportunity to significantly decrease the amount of labor spent in the building-installation work; it will allow a transformation of building production to a mechanized, continuous flow process of assembling the buildings and installing the equipment in the buildings which are built out of components and elements manufactured at the plant.

New decisions pertaining to the designs allow a standardization of the building components, a considerable curtailment in the number of sizes, and consequently an increase in the number of parts being produced along with a decrease in their cost. Therefore the number of parts for the main building and other installations decreases threefold. The expenditure of prefabricated reinforced concrete amounts to 350 cubic meters for every 100,000 rubles of building-installation work and 65 cubic meters for every 1,000 kilowatts of power yielded by the equipment being installed.

Construction out of prefabricated components will rise to a factor of 0.9. It is necessary to cite one more figure. The 1958 designs allowed for 66.1 thousand man days of labor for every 100,000 rubles of building-installation work, whereas the new designs show more than a twofold decrease in labor requirements. The cost per kilowatt of rated power output decreases correspondingly.

The technical level of hydrotechnical construction also increases. The expenditure of prefabricated reinforced concrete for every 100,000 rubles of building-installation work in the building of hydroelectric power plants increased over a five year period from 35 to 145 cubic meters. 66% of the Saratovskiy Hydroelectric Power Plant building, which is now under construction, will be assembled out of prefabricated reinforced concrete components.

Prefabricated reinforced concrete is also an important material for the construction of power transmission lines. Prefabricated, prestressed reinforced concrete used in tower supports will be used in over half of the projects during 1965.

In order to assure such a comprehensive scope in power construction, the Ministry took a firm course towards a widescale development of the building industry. It is founded on the creation of large rayon and inter-rayong production bases with powerful specialized enterprises, which are distributed in zones where power construction is concentrated. There is a total of 16 such rayons.

Such bases will include enterprises which will manufacture prefabricated reinforced concrete, metal components, piping, rock wool and rock wool products, gravel, scree and sand quarries with factories for the processing of raw materials as well as other projects which assure a comprehensive preparation and delivery of building components, materials, products and equipment of the construction of electric power plants.

The optimal capacities of the enterprises will be as follows: prefabricated reinforced concrete--200 thousand cubic meters, metal structures--20 thousand tons, piping--23 thousand tons, rock wool--80 thousand tons and quarry products--up to 1,500 thousand cubic meters per year. All this will permit a satisfaction of the requirements of power projects for components and materials with a radius of 1,000 kilometers, and within a radius of up to 1,500 kilometers for metal components.

Along with the construction of new enterprises 205 of the existing enterprises will be reconstructed and expanded. This will permit the establishment of five additional inter-rayon production bases.

The most important reconstruction and expansion projects will take place at the Dneprovskiy combine, the Berezovskiy plant in the Urals, the Dubrovskiy production combine (Leningradskaya oblast), the Troitskiy reinforced concrete products plant, the Tom'-Uskinskaya production base and others.

Towards the end of the Seven Year Plan some 4 million 200 thousand cubic meters of prefabricated reinforced concrete, rock products--28 million cubic meters. The output of metal components, heat insulation materials, piping, auxiliary boiler equipment, armature and insulators increased considerably.

It must be noted that during the past year, despite the impressive growth in the capacities of the building industry, the capital investment plan was fulfilled by only 72.5%. The Glavvos-tokenergstroy and the Glavgidroenergostroy

are especially backward in that respect. The main construction projects of these organizations--the Bratskgestroy, Krasnoyarskgesstroy and the Administration for the Construction of the Nazarovskaya GRES, fail to devote sufficient attention to the development of the base, and are constantly experiencing an acute shortage of prefabricated reinforced concrete and other materials.

This year the situation is a little better for the Ministry as a whole. The plan for the development of the building industry was overfulfilled for the first quarter. A lag is still noted at a number of the leading projects, however. The assignment to reconstruct the Zaporozhskiy quarry to be accomplished by Dneprostroy, for instance, was only half completed, and the reconstruction of the Volzhskiy high voltage tower plant--68% completed. This occurs because some of the directors have a narrow minded approach to the organization of work pertaining to the building of bases.

"Concrete and scree--it is not something for the power units; the people there will cuss and then will calm down"--reason the myopic directors.

It would be incorrect, however, to ignore the external reasons, which have a considerable effect on the development of the construction basis of power engineering. In order to eliminate the shortage of building materials, the State Planning Committee USSR must resolve the problem pertaining to the appropriation of additional capital investment funds for the current year.

On its own behalf the Ministry undertakes certain measures in order to effectively utilize capital investments in the building industry. The technical basis of the enterprises and quarries in particular, will increase considerably.

The policy of progressive development of the building industry is already yielding practical results. This predetermined abrupt change in the relationships between the building and installation operations at the thermal plants. In 1950-1955 three quarters of the work consisted of the actual building and only a quarter of the time was spent on installation work, whereas this year work pertaining to the installation of equipment will take up 35% of the overall time.

Radical changes that are occurring in production technique and installation work condition the ever increasing significance of the leading role performed by the organizations engaged in the installation of equipment. The need to specialize them, to make them independent and to institute a direct system of management are becoming a pressing need. A number of specialized trusts and administrations were created for that purpose. Their very first steps serve as a verification of the fact the choice was correct. On a basis of specialization, perfection of installation methods, particularly the application of progressive technology of block assembly, it was possible to lower the expenditure of labor for the installation of equipment by 30-35%. This in turn sharply decreases the duration of the

installation of various units and aggregates at the electric power plant as a whole.

The duration of the preparation period which occasionally stretches over two or three years, has a material effect on the time required for the construction of the electric power plant. This period of time may be curtailed by a transfer of the construction of the various components and building areas to a plant basis.

The design organizations of the Ministry have now developed a full complex of standardized installations, including movable buildings as well as general purpose buildings which may be assembled and dis-assembled in addition to heat installations and electric wiring installations.

All the necessary temporary structures at the construction site are composed of portable installations, with the exception of storage areas, the chief mechanic's workshop and the vehicle maintenance section. They will be pre-assembled buildings with a metal structural fram and asbestos-plywood lining.

Within the next five year period it will be necessary to prepare 225 sets of pre-assembled settlements for 3,000, 1,500, and 400 persons, 80 movable heating installation shops, 200 steam-boiler shops with a capacity of 5-10 tons per hour, 400 compressor shops, 60 electric workshops and 100 mechanical repair workshops, etc. Over 135 million rubles will be spent on mobile technological equipment during the seven year period.

It must be noted that the Ministry will not be able to produce all the necessary movable and pre-assembled buildings and installations in a short period of time in the production areas of their own enterprises. The assistance of the sovnarkhozes and other agencies is required in this case. It would probably be quite sensible to resolve these problems on a basis of cooperation with the Central Gas Administration USSR and the Ministry of Transport Construction, whose work is contiguous to that of the power engineers.

VOLTAGE REGULATOR

Following is the translation of an article by B. Glebov, in Vechernyaya Moskva, Moscow, 26 April 1961.

It is morning of an ordinary workday. The streets filled with moving automobiles, streetcars and trolley buses lost their first torrent of pedestrians. The workers and engineers disappeared behind the factory gates. Electric motors started humming at the shops, the row of "intelligent" automats came to life, bearings put together by the mechanical hands appeared on the moving conveyor belts.

The day was gathering momentum. Suddenly something very improbable happened. Hundreds of motors, shuddering, emitted blue sparks, slowed down and stopped. Unaccustomed silence prevailed at the workshops. The flow of transportation traffic on the streets stopped. The bright lights of the "jupiters" at the movie studio went out and the filming stopped in the middle of a difficult scene.

What is this? What happened? yelled the director into the telephone.

An accident--somebody's hurried voice answered him. They said that the power network that supplies us with electricity failed.

Such a technical failure could have occurred if the power engineers did not have devices capable of preventing it. The reasons for the failure have been known for a long time. In order to understand them let us recall that every power system is formed by a group of plants that operate with precisely synchronized rhythm.

In our country, for instance, every electric power plant generates alternating current, at 50 cycles per second. If even one station violates this tempo, the power system is doomed. The network tension will surge from zero to its highest limits. The armature winding of the motors will burn, the most complex industrial technological equipment will cease to function and precision instruments will be destroyed.

In 1937 Grigoriy Rafailovich Gertsenberg, a scientific worker of the All-Union Electrical Engineering Institute, along with his laboratory co-workers constructed an original regulator, which protects the power system from such regrettable incidents. The regulator automatically maintained the required tension of the network. It deviated only 1% from the assigned value. That was a real victory. Subsequently these instruments, which are not difficult to produce, performed an important role during the Patriotic War. The increased reliability of the power systems serving Moscow, Leningrad and Donbas.

Decades passed. One after the other great power giants arose in our country, which fed extensive systems which supply power not only to isolated cities or large populated points, but entire oblasts, krays and republics. It is hard even to imagine what incalculable damage would be caused by a failure of the power supply system under such circumstances.

The latest version of the regulator originally constructed by G.R. Gertsenberg and his laboratory co-workers is immeasurably better than the one which was made almost a quarter of a century ago. This is a peculiar super-sensitive and, in a manner of speaking, a technically "rational" constantly vigilant guardian. It is as if it constantly "analyses" the situation throughout the power system. Even though there are not perceptible deviations, the regulator already "senses" the impending surge in the current by symptoms that are not perceptible to man, and instantaneously, within a hundredth of a second, eliminates it, thereby preventing the possibility of a mishap and establishing the necessary balance in the network.

The importance of this remarkable device is understood only after grasping the characteristics inherent in the development of present-day power engineering in our country. Today electric power plants as a rule are built at a distance from the consumers. Moscow, for example, is connected with the Volzhskaya Hydroelectric Power Plant by a power line that is almost one thousand kilometers long. It is even farther from the capital to the Stalingradskaya Hydroelectric Power Plant, to the Bratskaya and the Krasnoyarskaya electric power plants, which are under construction. After they are completed extra long power transmission lines will stretch from them in all directions, and the power engineers will aspire to transmit as much power as possible over these lines. The greater the flow of current the greater the savings in the construction of new electric power plants and the greater the savings in fuel at the thermal electric power plants.

The new regulators acquire great significance. Due to their capability of maintaining a specified level they allow a 10-15% increase in the load carried by the power transmission lines.

These remarkable pieces of equipment, which were developed and produced at the workshops of the experimental plant of the All-Union Power Engineering Institute, have already been installed on almost all of the generators of the Volzhskaya and Stalingradskaya Hydroelectric Power Plants, and at some substations in the vicinity of Moscow. It will soon be possible to see them at the Bratskaya and the Krasnoyarskaya Hydroelectric Power Plants.

In these days of a tumultuous development of technology, says G.R. Gertsenberg, an unprecedented increase in the power of the machines that generate electricity is evident. Some 20 years ago a generator with a capacity of 50 thousand kilowatts was considered a technological "miracle" whereas at the present time the capacities expand at a fantastic rate and the former giants are dwarfed by comparison.

The capacity of each generator at the Krasnoyarskaya Hydroelectric Power Plant, for example, will be equivalent to that of the entire Dneprovskaya Hydroelectric Power Plant, and there will be no less than ten such machines there. But even these machines, which seem to be unsurpassed in their high quality have their own deficiencies. The power generated by these machines is considerably more difficult to transmit over great distances than the power produced by smaller generators. It is also noted that the synchronization of the work of these gigantic machines is interrupted and they manifest a vividly perceptible "tendency" to cause failures in the power system.

In order to make them more reliable the giant generators are improved and increased in size. The amount of equipment at the electric power plants also therefore increases with consequent additional expenses.

The new regulators, for the development and impelmentation of which G.R. Gertsenberg was awarded the Lenin Prize, maintains a normal operating level both at the super powerful and the ordinary electric power systems with equal precision.

In conclusion it remains for us to add that the regulators, similar to the ones created by G.R. Gertsenberg and by a large group of industrial scientists and specialists guided by him, are not available in any of the western countries, not even in the most highly developed ones. In this field the Soviet scientists left their foreign colleagues far behind.

TRANSMISSION LINES ACROSS THE MOUNTAIN TOPS TO HUNGARY

Following is the translation of an article by B. L'vov in Stroitel'naya Gazeta, Moscow, 30 April 1961.

The power massif of Europe. Do not search for that term in handbooks of encyclopedias. You will not find it on the maps that show the construction of power systems. It is a new concept that is still a little strange but one that became firmly entrenched and exists not only on the sketches and blueprints of the designers but is also found, in a manner of speaking, in nature--in the intertwined forests of high voltage towers, in the low hum of the wires and in the sparkling rows of insulators.

The first high voltage line of the power massif Dobrotvory-Tissa-Shayoseged (Hungary) is in the midst of construction. It is only one of the power transmission lines that were recommended by the Council of Economic Mutual Assistance. They will join together the power systems of the German Democratic Republic, Poland, Czechoslovakia, Hungary, the western part of the Ukrainian SSR, Poland and the Kaliningradskaya oblast.

In that manner a unified massif of electric power plants of the people's democracies and the western rayons of the Soviet Union will come about.

The first line is 417 kilometers long. Approximately two-thirds of that line passes over the territory of the USSR. The Soviet builders are also erecting a substation at Mukachev, while the Hungarian builders are constructing one at Shayoseged. The fraternal countries naturally coordinate their efforts and direct them at the fastest accomplishment of the common goal.

Operations in the Soviet sector of the international line are being conducted by the personnel of mechanized column No. 34 of the Conbasselektromontazh trust. Its main object is the postwar restoration of the power systems in the Dneprov area. The fitters did not neglect that trunk line, which, like the Trans European Oil pipeline, presently under construction nearby, was called the main line of people's friendship.

The first segment of the line on the Dobrotvory-L'vov and Stryy-Volovets sectors, which is over 140 kilometers long, is already in operation. These are the lines that march across the Carpathian Mountains like fairy tale giants, steel masts, bearing life-giving power on their shoulders. That is how the finished sector looks, as photographed by our photo correspondent S. Petrov.

Operations in the Stryysiy and Mukachevskiy directions are in

full swing. Foundations are being laid at full speed, towers installed and land cleared in the forested areas of Trans Carpathia.

It is planned to also build a new line Ludush-Lemeshany. That line will connect the power systems of Rumania with those of Czechoslovakia. It will stretch across Soviet territory for a distance of 120 kilometers from the Uzh river to the D'yakovo settlement.

In a few years mighty rivers of power will carry their inexhaustible torrents, multiply the economic might of the fraternal countries, and accelerate their tumultuous progress towards a coveted common goal--the name of which is--communism.

THE ELECTRIC POWER PLANT OF THE NOT TOO DISTANT FUTURE

Following is the translation of an unsigned article in Kommunist, Yerevan, 19 April 1961. _/

Methods for converting heat energy into electric power are nothing particularly new. Small electric power plants, which operate on that principle, have been in practical use for a long time. They are the ones which, by transforming the thermal energy of the sun into electric power, with the help of semi-conductors, feed the research, telemetering and other equipment on board the artificial Soviet earth satellites and the automatic interplanetary stations.

The idea behind these electric power plants is most enticing. By converting heat directly into electric power we obtain the possibility of eliminating the gigantic rotating machines--a source of trouble and unproductive losses. Why then are such plants not constructed on a large scale? The fact of the matter is that the coefficient of their useful action is so far very low--no more than 10%, and their capacities are also rather low. Therefore their use in industry would at the present time be unprofitable.

Now, however, a new science comes to the assistance of the power engineers--magnetohydrodynamics. It is an offspring of two scientific disciplines--electrodynamics, that studies the phenomena of electricity and magnetism, and hydrodynamics, which investigates the peculiarities of fluids in motion (and in a number of cases, that of gasses). Both of these sciences are amalgamated in order to study the phenomena which occur when the fluids or gasses become conductors of electricity.

By utilizing that property of a liquid or a gas, it is possible to create a machine which converts heat energy directly into electric power--the so-called magnetohydrodynamic generator of electric current. Its basic principle differs little from an ordinary power generator. The only difference is that the armature winding in this case does not consist of a metal wire but is replaced by a flow of electrically conductive disassociated fluid or of gas ionized through heating.

What will such a magnetohydrodynamic electric power generator look like in practice?

The fuel, which may be coal, oil, or nuclear fuel is burned in the compression chamber; air is forced into it under a considerable pressure. In that chamber the air is heated to a temperature of up to 2,900 degrees, becomes ionized, and thereby acquires the properties of a conductor. From there at great velocity it passes through the magnetic field of the generator, sending the resultant direct current

into the network. No boilers, turbines, no rotating or any moving metal parts are necessary. Possibilities for the automation of the production of electric power are really limitless.

It is true that in order to decrease the loss of heat and to raise the coefficient of useful action of the electric power plant the gas, after it has served its purpose in the power generator, may be piped to a conventional steam installation, which operates according to the classic system (steam boiler--steam turbine). But in this case such an installation will be of a secondary significance; it will generate only one-third of all the electric power which will be yielded by such a plant.

Calculations indicate that the coefficient of useful action of the electric power plant with a magnetohydrogenerator comes to approximately 60%, which is considerably greater than that for any of the present day thermal electric power plants. This means that it will be possible to generate the same amount of electricity as before with a considerably smaller expenditure of fuel. The cost of the power generated in that manner will not be higher than that produced by an ordinary electric power plant.

The successes of science and technology in the field of studies of the properties and behavior of gasses under high temperatures and in the creation of new heat resistant materials make the possibility of creating such power plants quite realistic. Drafts for industrial electric power plants of that type with a power capacity of 450 thousand kilowatts have already been developed, and it is possible to hope that the time is near when these drafts will become a reality.

TO DEVELOP AND PERFECT ECONOMIC TIES BETWEEN KIRGIZIYA
AND UZBEKISTAN

Following is the translation of an article by B. Druker
in Narodnoye Khozyaystvo Uzbekistana, No. 3, Tashkent,
March 1961, pages 9-12. -7

Cooperation between Kirgiziya and Uzbekistan in the development of a power basis is expanding.

A large network of electric power plants was established during the years of socialist construction in Kirgizia, which in 1960 generated 4.6 times more electric power than during 1950.

Kirgizia possesses colossal fuel and water power resources. In water power resources it occupies a third place in the country to those of the Russian Federation and Tadzhikistan. It is estimated that the potential capacity of possible hydroelectric sources of the republic is 15 million kilowatts. However, with the existence of so rich a power potential the rate of increase in the production of electric power lags considerably behind the demands of the national economy. This hinders the growth of the national economy, and the republic is obliged to cover its deficit in electric power by tapping outside sources.

Almost 17% of the electric power used in the republic is supplied through power networks from the Uzbek and Tadzhik SSR. It is true that after the construction of the Uch-Kurganskaya Hydroelectric Power Plant the lack of electric power in the south of the republic will be eliminated; by 1965, however, the Osheskaya oblast will start receiving additional electric power from Uzbekistan. In connection with that it is appropriate to mention that it is necessary to connect the kolkhoz hydroelectric power plants of southern Kirgizia to the Ferganskaya power system on a wider scale as that will have a mutual effect.

The necessity for a systematic expansion of power capacities is associated not just with the rapid tempos of development of the economy of Kirgizia during the current seven year period. It is necessary to take into account the fact that after the seven year period it is possible that a number of large power consuming enterprises will be constructed both in Kirgizia and Uzbekistan. It must be remembered that Kirgizia, along with Tadzhikistan, represents a significant potential reserve of hydroelectric power, which may in the future satisfy the demands of Kirgizia and Uzbekistan as well as those of the southern rayons of Kazakhstan for electric power.

Hydroelectric power construction projects of primary importance

in the basins of the Naryn and Kokomeran rivers, in accordance with a preliminary plan of the SAOGIDEP (Sredue Agiatskiy Gosudarstvennyy Trest po Proektizovaniyu Gidroelektricheskikh Stantsiy i Gidrouzlov --State Trust for the Planning of Hydroelectric Power Plants) may be the Karasuyskaya, Tash-Kumyrskaya, Susamyrskaya and Kokomerenskaya Hydroelectric Power Plants, which have an inter-rayon significance. The indicated hydroelectric power plants promise to be very economical to construct; the capital investments on the average will not exceed 1,200 rubles per kilowatt of rated power, and the cost of production per kilowatt hour will be no more than 0.5-0.6 kopeks. These hydroelectric power plants with time will become a link in the unified power system of the Central Asian economic-geographic rayon.

Comrade N.S. Khrushchev, in his speech delivered at the January (1961) Plenum of the Central Committee CPSU stated that: "In order to resolve the irrigation problem we must confront the task of building quite a few new hydrotechnical units in the various rayons of the country, as, for instance, the Nurekskaya Hydroelectric Power Plant. In connection with that I wish to state that we are still not adequately familiar with our country and its richest resources. If we knew it better, it would then have been necessary to devote funds to the construction of the Nurekskaya and other hydroelectric power plants in the rayons of Central Asia, a long time ago."

Kirgizia and Uzbekistan are faced with the tasks of resolving the problems pertaining to the construction of the hydroelectric power plants mentioned above whose significance for both republics may be compared to the significance of the Nurekskaya Hydroelectric Power Plant, which is presently under construction in Tadzhikistan, to Central Asia.

A vast amount of cheap electric power will be used for the further expansion of the power pool of all the branches of the national economy of Uzbekistan and Kirgizia.

Cheap power may be used for the irrigation of droughty rayons in Uzbekistan, with great success, as well as for the assimilation of new land for cotton and other crops.

THE CHARVAKSKAYA HYDROELECTRIC POWER PLANT IS NEXT

Following is the translation of an article by M. Zherebtsov in Narodnoye Khozyaystvo Uzbekistana, No. 3, Tashkent, March 1961, pages 21-24. _/

The successes attained in the electrification of Soviet Uzbekistan are indisputable. At the present time its industry relies on a mighty power basis. The building of sixteen hydroelectric power plants of the Chirchik-Dozsuyskiy tract, the Parkhadszkaya Hydroelectric Power Plant on Syr-Dar'ye and the Tashkentskaya Thermal Electric Power Plant all performed an important role in the supply of power to the national economy of the Tashkent oblast and laid the foundation for the creation of a mighty supply of power for the entire republic.

At the present time the construction of the second section of the Angrenskaya GRES (Gosudarstvennaya Rayonnaya Elektricheskaya Stantsiya—State Rayon Electric Power Plant) is nearing completion. The capacity of the plant will be raised to 400 thousand kilowatts within the immediate future, while by the end of 1963 it will reach 600 thousand kilowatts. The construction of the Angrenskaya GRES was dictated by the necessity of having stable power in the system, that would be independent of the whims of nature, as well as by the existence of large supplies of lignite which is mined cheaply by means of the open pit method.

The discovery of very rich reserves of natural gas in the Bukharskaya oblast and the construction of the Kzharkak-Tashkent gas pipeline created favorable circumstances for the construction of large economical thermal electric power plants of the open type at Navoi and Tashkent.

The constantly growing demands of the national economy for electric power requires a constant expansion of power capacities. In 1958 an output of 4.7 billion kilowatt hours of power more or less satisfied Uzbekistan's demands for power, whereas in 1961 with the production of 6.5 billion kilowatt hours, a number of cities and rayons of the republic are experiencing a lack in electric power. Continuing construction of electric power plants and electric power networks is necessary.

During the past two years of the Seven Year Plan units having capacities in excess of 200 thousand kilowatts were installed only at the turbine electric power plants of Uzbekistan and over 500 kilometers of power transmission lines with a tension of 50 kilovolts or

more were constructed. The Tashkentskaya and Ferganskaya Power Systems are connected by a power transmission line having a tension of 110 kilovolts, and now have the possibility of exchanging power capacities up to a limit of from 50 to 60 thousand kilowatts. In 1961 the capacity of electric power plants will expand by 300 thousand kilowatts and the length of the electric power transmission lines with a tension of 35 kilovolts and more will increase by over 650 kilometers.

During the early fifties SAOGIDEP (Sredue Aziatskiy Gosydarstvennyy Trest po Proyektirovaniyu Gidroelektricheskikh Stantsiy i Gidroenergouzlov--Central Asiatic State Trust for the Planning of Hydroelectric Power Plants and Developments), continuing its work in the assimilation of water power resources of Central Asia, made a proposal to construct a cascade of Srednechirchikskiskiye hyrdoelectric power plants above the main center of the Chirchikskikh Hydroelectric Power Plants, including the Charvakskaya Hydroelectric Power Plant with a seasonally regulated water reservoir.

The basic tenets of the design assignment pertaining to this structure were developed in 1955; its unique quality and the difficult natural conditions, however, demanded additional scientific research work, which slowed down the assignment of the design work. It underwent a number of changes in the process of completion and was completed as late as 1959, approved by the Ministry for the Construction of Electric Power Plants USSR and was submitted for examination by the technical-economic experts of the State Planning Committee USSR.

The design assignment pertaining to the Charvakskiy hydroelectric center stipulates the construction of a 150 meter high dam of the mixed type out of local materials, of a seasonally regulated water reservoir having a useful capacity of 1.2 billion cubic meters, of a hydroelectric power plant with a capacity of 480 thousand kilowatts and a settlement. With the introduction of the water reservoir the supply of water for 335 thousand hectares of irrigated land of the Chirchik-Keleskiy irrigation rayon will improve considerably and some 93 thousand additional hectares will be placed into use. The Chirchik-Angren-Kelesskiy basin, which is situated below the hydroelectric center contains very favorable conditions for the further development of cotton growing and suburban farming. The soils of the rayon are not afflicted with a high content of salt. It does not experience a lack in manpower.

All the basic features of the design for the Charvakskaya Hydroelectric Power Plant, the type of dam that was adopted, the equipment for the hydroelectric plant as well as the types of other structures did not encounter any objects on behalf of the State Planning Committee USSR. It accepted the established capacity for the Hydroelectric Power Plant with an annual output of electric power amounting to 1.96 billion kilowatt hours. Calculations made by the designers were confirmed, according to which the average annual output of electric power by the operating hydroelectric power plants of the Chirchik-Bozsuyskiy tract will increase by 230 million kilowatt hours in connection with the introduction of the Charvakskiy Hydroelectric Power Center.

The Charvaksкая Hydroelectric Power Plant will permit an increase in the capacity of the Uzbek power system during peak loads and will make it more flexible; it will also improve the working regime of the active hydroelectric power plants of the Chirchik-Bozsuyskiy cascade. The first unit will be placed into operation in 3.5 to 4 years after construction starts. The experts considered it possible to complete the construction of the Charvakskiy Hydroelectric Power Center by 1964-1965.

The outstanding feature of the Chervakskiy power center is the comprehensive utilization of the water power resources. It will provide cheap electric power and will irrigate large areas of land. The construction of a dam will prevent destructive flooding of Chirchik. A large artificial sea will form in the picturesque mountain area with a healthy climate. Health resorts, rest homes and tourist centers will be built along its shores.

The government of the republic, starting with 1954, has on more than one occasion posed the question pertaining to a start of construction work on the Charvaksкая Hydroelectric Power Plant.

During the preparation of the draft for the Seven Year Plan for the development of the National economy of the Uzbek SSR, the Charvaksкая Hydroelectric Power Plant was shown as one of the most important projects in the construction of power systems. The discovery of a large deposit of natural gas in the Bukharskaya oblast and the decision regarding the construction of a gas line to Tashkent created conditions for the inclusion of a large power project into the plan with smaller capital expenditures and a possibility for a more rapid introduction of the Tashkentskaya GRES. In addition to that the republic was limited with respect to capital investments in power construction. Under these conditions the Charvaksкая Hydroelectric Power Plant, as a power project, could not have been included into the plan for 1959-1965.

At the present time the conditions have changed. The resolution of the January (1961) Plenum of the Central Committee CPSU states that our country has the possibility of seriously increasing capital investments above those stipulated by the Seven Year Plan for the development of agriculture, on a basis of the industrial accumulations.

END